Remarks and Arguments

Claims 1, 2, 4, 7, 16, 18, 20, 25, 27, 32, 33, 35, 38 and 47 have been rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent Publication No. 2003/0055972 (Fuller, previously cited) in view of U.S. Patent No.6,822,940 (Zavalkovsky) The examiner comments that Fuller discloses all of the claimed limitations with the exception that it does not explicitly disclose determining a corrective modification of one at least one resource deployment or configuration based on the measured service level parameter values when the value for the service level parameter for the resource does not satisfy the predetermined service level thresholds as recited, for example, in claim 1. However, the examiner asserts that Zavalkovsky discloses monitoring service levels and reassigning flows associated with a particular service level when an interface is overloaded in order to relieve the overload condition. The examiner concludes that it would have been obvious to combine Fuller and Zavalkovsky because a modification of a resource in order to reach an agreed to level of service is taught in Zavalkovsky.

The Fuller reference has already been discussed in detail. As previously stated and as agreed by the examiner, Fuller does not teach or suggest a modification of the network when the terms of a Service Level Agreement (SLA) are not being met. Instead, Fuller teaches notifying an administrator when the terms of the SLA are not being met, for example by illuminating warning icons.

The Zavalkovsky reference discloses a system in which congestion information for network traffic that is passing through an interface associated with a network device is monitored. If the congestion information indicates that contracted service levels are not being met, the network traffic pattern is altered by directing one or more data flows passing through the interface to other network devices or by increasing the size of a buffer in the interface to accommodate more data packets before an overflow occurs. However, Zavalkovsky does not teach or suggest first monitoring a network device (or resource) and then altering the deployment or configuration of the resource itself in order to meet an SLA.

Since neither Fuller nor Zavalkovsky teaches or suggests that the deployment or configuration of a monitored resource should be altered in order to meet an SLA, the combination of these two references cannot teach or suggest this feature.

The claims have been amended to particularly point out this feature. Claim 1 is illustrative. It now recites, in lines 11-14, "... determining a corrective modification of one at least one resource deployment or configuration based on the measured service level parameter values when the value for the service level parameter for that at least one resource does not satisfy the predetermined service level thresholds ..." (emphasis added). Claim 18 has been amended to contain similar limitations in lines 12-15 and claim 25 contains similar limitations in lines 16-20. Finally, claim 32 contains similar limitations in lines 11-14. Therefore, these claims also patentably distinguish over the cited combination of the Fuller and Zavalkovsky references in the same manner as claim 1.

Claims 2, 4, 7 and 16 are dependent, either directly or indirectly, on claim 1 and incorporate the limitations thereof. Therefore, they distinguish over the cited reference in the same manner as claim 1.

Claim 20 is dependent on claim 18 and incorporates the limitations thereof. Therefore, it distinguishes over the cited reference in the same manner as claim 18.

Claim 27 is dependent on claim 25 and incorporates the limitations thereof. Therefore, it distinguishes over the cited reference in the same manner as claim 25.

Claims 33, 35, 38 and 47 are dependent, either directly or indirectly, on claim 32 and incorporate the limitations thereof. Therefore, they distinguish over the cited reference in the same manner as claim 32.

Claims 3, 19, 26 and 34 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of U.S. Patent Publication No. 2002/0069377 (Mabuchi, previously cited) and U.S. Patent No. 6,381, 637 (Kamada, previously cited) and further in view of U.S. Patent No. 5,504,858 (Ellis, previously cited.) The examiner comments that Fuller and Zavalkovsky disclose all of the claimed limitations with the exception that they do not explicitly disclose that the service level parameters include downtime, unavailability to applications and hosts, throughput and I/O transaction rate. However, the examiner asserts that Mabuchi discloses monitoring the amount of time that a storage device is defective, Kamada discloses unavailability and Ellis discloses monitoring of request and data rates. The examiner concludes that it would have been

obvious to combine Fuller, Mabuchi, Kamada and Ellis because they are all in the same field.

As previously discussed, Mabuchi, Kamada and Ellis disclose various aspects of system performance monitoring, but none of the references is directed to the problem of service level monitoring and automatic reconfiguration of monitored system resources to achieve a contracted service level. Thus, their combination with Fuller and Zavalkovsky cannot teach or suggest a corrective modification of a resource deployment or configuration based on monitored service level values for that resource, an operation that, as discussed above, Fuller and Zavalkovsky do not teach. Thus, the combination of Fuller/Zavalkovsky with Mabuchi, Kamada and Ellis does not teach or suggest the limitations recited in the independent claims 1, 18, 25 and 32. Since claims 3, 19, 26 and 34 are dependent on claims 1, 18, 25 and 32, respectively, they distinguish over the cited combination of references in the same manner as the independent claims.

Claims 5, 6, 21, 28, 36 and 37 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of Ellis. The examiner comments that Fuller and Zavalkovsky disclose all of the claimed limitations except that they do not disclose determining a time period during which the service level available to a customer does not satisfy the contracted service level parameters. However, the examiner asserts that Ellis discloses monitoring a data rate in a read/write operation and that it would have been obvious to combine Fuller/Zavalkovsky and Ellis because both references are related to storage systems.

As discussed previously Ellis is not directed to the problem of service level monitoring and automatic reconfiguration of monitored resources to achieve a contracted service level. Thus, its combination with Fuller/Zavalkovsky cannot remedy the omissions of Fuller and Zavalkovsky as discussed above. Thus, the combination of Fuller/Zavalkovsky with Ellis does not teach or suggest the limitations recited in the independent claims 1, 18, 25 and 32. Since claims 5, 6, 21, 28, 36 and 37 are dependent on claims 1, 18, 25 and 32, respectively, they distinguish over the cited combination of references in the same manner as the independent claims.

Claims 8, 10, 12, 17, 22, 23, 29, 30, 39, 41, 43 and 48 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of U.S. Patent

Publication No. 2003/0074599 (Golasky, previously cited.) The examiner comments that Fuller and Zavalkovsky disclose all of the claimed limitations except that they do not disclose determining which resource caused the service level to not meet the contracted level, determining if another resource of that type is available and, if so, allocating another resource to service the customer.

The examiner indicates that Golasky discloses determining whether an additional instance of a resource that caused a service level to not meet a contracted level is available and, if so, allocating another resource to service the customer at paragraph [0025] lines 1-11. However, at the latter location Golasky discloses that an agent module, upon learning that a logical storage unit has failed, obtains another logical unit (which may be an unused logical unit) and assigns it to the host that was previously assigned to the failed unit. Claim 8 depends on claim 1 and incorporates the limitations thereof. The two claims together recite that during the operation of a system, a plurality of service level parameter values are measured and monitored to determine whether the measured service level parameter values satisfy predetermined service level thresholds and when they do not, determining a corrective modification of at least one resource deployment by determining which resource caused the service level to not meet the contracted level, determining if another resource of that type is available and, if so, allocating another resource to service the customer.

As previously mentioned, Fuller and Zavalkovsky do not disclose determining a corrective modification of at least one resource deployment based on measured service level values and then correcting the deployment of the resources that were monitored. Golasky does not disclose monitoring service levels at all. Instead it discloses that a failed logical unit is replaced. Golasky determines that a logical unit has failed, not by measuring service level values, but by receiving a message that the unit has failed. See Golasky, paragraph [0027], lines 1-12. Therefore, combining Golasky with the teachings of Fuller and Zavalkovsky does not teach or suggest the subject matter of claim 8 (which incorporates the subject matter of claim 1.

Claims 10, 12 depend on claim 8 and incorporate the limitations thereof. Therefore, they distinguish over the cited combination of references in the same manner as claim 8. Claims 22, 29 and 39 contain limitations that parallel those in claim 8 and

distinguish over the cited combination of references in the same manner as claim 8. Claims 23, 30, and 41 depend on claims 22, 29 and 39, respectively, and incorporate the limitations thereof. Therefore, they distinguish over the cited combination of references in the same manner as their respective parent claims.

Claims 9 and 40 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of Golasky and further in view of Ellis. The examiner comments that Fuller, Zavalkovsky and Golasky disclose all of the claimed limitations except that they do not disclose analyzing the resource deployment by using a bottleneck analysis. However, the examiner asserts that Ellis discloses that accessing a storage device can cause a bottleneck and that it would have been obvious to combine Fuller, Zavalkovsky, Golasky and Ellis because these three references are related to storage systems. Fuller, Zavalkovsky, Golasky and Ellis have been discussed above. Also, as previously discussed, they do not teach an automatic resource deployment using a bottleneck analysis in order to arrive at a modification of monitored resources as recited in claims 9 and 8 (on which claim 9 depends). Thus, the claims patentably distinguish over this combination of references.

Claims 11 and 42 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of Golasky and further in view of Ellis and U.S. Patent No. 6,301,605 (Napolitano, previously cited) and U.S. Patent No. 5,956,750 (Yamamoto, previously cited.) The examiner comments that Fuller, Zavalkovsky and Golasky disclose all of the claimed limitations except that they do not expressly disclose specific access characteristics including read/write ratio, input/output size, and percentage of sequential or random accesses. However, the examiner asserts that Ellis discloses the measurement of read/write ratios, Yamamoto discloses measuring the percentage of sequential or random accesses and Napolitano discloses that file size can be monitored in I/O transactions.

As previously discussed, neither Ellis, Napolitano nor Yamamoto is directed to the problem of service level monitoring and automatic reconfiguration of monitored resources to achieve a contracted service level, their combination with Fuller, Zavalkovsky and Golasky cannot remedy the omissions of Fuller and Zavalkovsky as discussed above. Thus, the combination of Fuller, Zavalkovsky, Golasky, Ellis,

Napolitano and Yamamoto does not teach or suggest the limitations recited in the independent claims 1 and 32. Since claims 11 and 42 are dependent on claims 1 and 32, respectively, they distinguish over the cited combination of references in the same manner as the independent claims.

Claims 13, 24, 31 and 44 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of U.S. Patent No. 6,006,251 (Toyouchi, previously cited.) The examiner comments that Fuller and Zavalkovsky disclose all of the claimed limitations except that they do not disclose that applications in the system can be assigned a priority and that changing the deployment of resources to meet contracted service levels can include changing the priority of applications. However, the examiner asserts that the Toyouchi reference discloses dividing information requests into priority groups and changing priorities based on a relationship to a parameter.

As previously discussed, the Toyouchi reference is not directed to the problem of service level monitoring and automatic reconfiguration of monitored resources to achieve a contracted service level and, thus, its combination with Fuller and Zavalkovsky cannot remedy the omissions of Fuller and Zavalkovsky as discussed above. Thus, the combination of Fuller, Zavalkovsky and Toyouchi does not teach or suggest the limitations recited in the independent claims 1, 25 and 32. Since claims 13, 24, 31 and 44 are dependent on claims 1, 25 and 32, respectively, they distinguish over the cited combination of references in the same manner as the independent claims.

Claims 14 and 45 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of Toyouchi and further in view of Golasky The examiner comments that Fuller, Zavalkovsky and Toyouchi disclose all of the claimed limitations with the exception that they do not disclose analyzing a resource deployment in order to determine which resource caused the service level to not meet the contracted level, determining if another resource of that type is available and, if so, allocating another resource to service the customer. However, the examiner asserts that Golasky discloses a system in which the failure of a resource causes another backup resource to be utilized and that it would have been obvious to combine Fuller, Zavalkovsky Toyouchi and Golasky because all of these references are related to storage systems.

Claim 14, which depends indirectly on claim 1, recites limitations similar to those recited in claim 8 discussed above, Therefore, it distinguishes over the cited reference combination in the same manner as claim 8 as discussed above.

Claims 15 and 46 have been rejected under 35 U.S.C. §103(a) as obvious over Fuller and Zavalkovsky in view of U.S. Patent Publication No. 2001/0044907 (Yoshimoto, previously cited.) The examiner comments that Fuller and Zavalkovsky disclose all of the claimed limitations with the exception that they do not disclose that a service level parameter that could cause the service level to fall below the contacted value could be an input/output throughput parameter. However, the examiner asserts that Yoshimoto discloses a system that monitors input/output throughput and that it would have been obvious to combine Fuller, Zavalkovsky and Yoshimoto because all of these references are related to storage systems.

The Yoshimoto reference has nothing directly to do with the problem of service level monitoring and automatic reconfiguration of monitored resources to achieve a contracted service level. Thus, its combination with Fuller and Zavalkovsky cannot remedy the omissions of Fuller and Zavalkovsky that are discussed above. Thus, the combination of Fuller, Zavalkovsky and Yoshimoto does not teach or suggest the limitations recited in the independent claims 1 and 32. Since claims 15 and 46 are dependent on claims 1 and 32, respectively, they distinguish over the cited combination of references in the same manner as the independent claims.

In light of the forgoing amendments and remarks, this application is now believed in condition for allowance and a notice of allowance is earnestly solicited. If the examiner has any further questions regarding this amendment, he is invited to call applicants' attorney at the number listed below.

Respectfully submitted,

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